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REMARKS

Claims 1-5, 7-33, 35, 36, 38 and 39 are pending in the application. Claims 1, 7, 12, 19, 24, 29, 35 and 38 are independent.

First, Applicants thank the Examiner for withdrawing the objection to the oath/declaration, and also for withdrawing the finality of the rejection of the last Office Action.

Rejections Under 35 USC Sec. 102(e) and Sec. 103(a)

Claims 1-3, 5-18, 29-31, 33, 35 and 38 were rejected under 35 USC Sec. 102(b) as being anticipated by newly-cited WO 98/18210 (Jokinen); Claims 4, 32, 36 and 39 were rejected under 35 USC Sec. 103(a) as being unpatentable over Jokinen in view of Hewitt (US Patent No 6,526,538); and Claims 19-28 were rejected as being unpatentable over Jokinen.

The rejections are respectfully traversed and reconsideration is requested.

Independent Claim 1 is directed to a method for identifying impairments in a digitally modulated signal comprising the steps of obtaining soft decision data derived from the digitally modulated signal, applying a plurality of impairment masks to the soft decision data, each impairment mask associated with a *different impairment type*, determining a subset of the soft decision data that occur within each impairment mask, calculating a correlation weight based on each subset, and, based on the correlation weights, determining a likelihood *that a particular impairment type* is affecting the digitally modulated signal.

Independent Claim 7 is directed to a method for detecting impairment of a digital signal comprising the steps of calculating a first correlation weight for a first symbol-level impairment mask, storing the first correlation weight, calculating a second correlation weight for a first constellation-level impairment mask, the first constellation-level impairment mask operative to detect *a different impairment type* than the first symbol-level impairment mask, storing the second correlation weight, and calculating an overall correlation weight based on the first correlation weight and the second correlation weight.

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Independent Claim 12 is directed to a digital receiving apparatus including a receiver responsive to a digitally modulated signal to perform conversion of the digitally modulated signal to soft decision data and an impairment correlator operatively coupled to the receiver and responsive to the soft decision data *to correlate a plurality of different types of impairments* of the digitally modulated signal.

Independent Claim 19 is directed to a cable modem comprising a cable modem receiver responsive to a downstream signal to perform conversion of the downstream signal to soft decision data and an impairment correlator operatively coupled to the cable modem receiver and responsive to the soft decision data to correlate *a plurality of different types of impairments* of the downstream signal.

Independent Claim 24 is directed to a cable modem termination system comprising a cable modem termination system receiver responsive to an upstream signal to perform conversion of the upstream signal to soft decision data and an impairment correlator operatively coupled to the cable modem termination system receiver to correlate *a plurality of different types of impairments* of the upstream signal.

Independent Claim 29 is directed to a program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for identifying impairment of a digitally modulated signal received by the machine, the method steps comprising applying a plurality of impairment masks to soft decision data derived from the digitally modulated signal, *each impairment mask associated with a different impairment type*, determining a subset of the soft decision data that occur within each impairment mask, calculating a correlation weight based on each subset and, based on the correlation weights, determining a likelihood that a particular impairment type is affecting the digitally modulated signal.

Independent Claim 35 is directed to a method for identifying a type of impairment in a system communicating a digitally modulated signal comprising the steps of obtaining soft decision data derived from the digitally modulated signal, performing ratio analysis on the soft decision data, and reporting a likelihood that *a plurality of types of impairments* corresponding to the ratio analysis are affecting the digitally modulated signal.

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Independent Claim 38 is directed to a program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for identifying impairment of a digitally modulated signal received by the machine, the method steps comprising deriving soft decision data from the digitally modulated signal, performing ratio analysis on the soft decision data derived from the digitally modulated signal and reporting a likelihood that *a plurality of types of impairments* corresponding to the ratio analysis are affecting the digitally modulated signal.

Jokinen is directed to a receiving method in which, in order to remove interference of a received composite signal, narrowband interfering signal estimates corresponding to the interfering signals are subtracted from a narrowband composite signal.

More specifically, Jokinen illustrates a method for a receiver structure to perform signal recovery of a desired original signal that has been corrupted by the presence of multiple time shifted copies of the desired original signal, i.e. Jokinen's definition of the received composite signal with which Jokinen's method operates upon is a signal that has multipath distortion (Applicants' submit that this is the only distortion that Jokinen recognizes and can compensate for).

Jokinen may be viewed as providing a teaching of a receiver's equalization structure that performs the following tasks in an effort to recover the highest signal-to-noise of the original transmitted signal:

a) the coefficients of the receiver's equalizer, corresponding to the cross correlation of the received signal, are compared in an effort to find the time relationship between the original desired signals and the time shifted copies of the original desired signals that interferes with the original desired signals; and

b) the receiver performs optimization of the desired signal by establishing as a reference the original signal's receive time and subtracting the time-shifted signals, to produce a final received signal = (original signals + multipath signals - multipath signals) = original signals.

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As defined by the pending claims, a method/apparatus/system according to Applicants' teachings is not anticipated or rendered obvious by the teachings of Jokinen. Specifically, Applicants provide a teaching of how to discover what particular type of signal distortion is present in a composite received signal. The distortion type includes many classes of signal distortion that Jokinen's system simply does not recognize and would not be "looking for" or "able to compensate for"

As recited in the method of independent Claim 1, for example, the step of "calculating a correlation weight based on each subset", and, based on the weights, "determining a likelihood that each particular distortion type is present" – provides a : means to discover the dominant distortion in the presence of multiple distortion types. Independent Claims 12, 19, 24, 35 and 38 all also recite some type of "correlative property" in the detection of impairments of a digital signal.

In addition, the method/device in accordance with independent Claims 7 and 29, respectively, for example, further define over Jokinen in that Applicants' recited method/device implements multiple spatial masks at the symbol and constellation level that are applied over the time duration of the received composite signal. Each mask is designed to analyze the received composite signal for a particular type of signal distortion. The comparisons of the distribution of the received signal in relation to these spatial masks categorize the likelihood, severity and presence of a particular type of signal distortion.

A method/apparatus/system in accordance with Applicants' teachings does *not* attempt to recover a transmitted signal for the purpose of demodulating, but rather it analyzes the signal. The aim of Jokinen's method, on the other hand, is to efficiently recover a desired signal in the presence of a signal's alteration of a single predefined type of signal distortion.
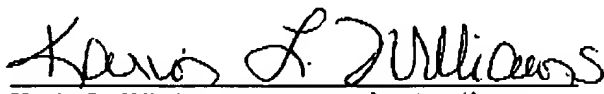
For all of the foregoing reasons, Applicants respectfully submit that each of independent Claims 1, 7, 12, 19, 24, 29, 35, and are patentable over the cited references. Dependent Claims 2-5, 8-11, 13-18, 20-23, 25-28, 30-33, 35, 37, and 39 are believed to be patentable over the cited art as depending from one or another of the independent claims, and as reciting additional patentably distinct limitations.

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Applicants, therefore, submit that all claims are patentable over Jokinen and over any other of the cited references, and that the application is in condition for allowance.

If a telephone conference would facilitate examination of this application in any way, the Examiner is invited to contact Applicants' undersigned attorney. The Examiner's consideration of this matter is gratefully acknowledged.

Respectfully submitted,
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